accumulated to estimate the delivered dose after which the dose-volume histograms were calculated on the pCT using the original contours. Treatment plan adaptations applied in clinical practice were ignored in this analysis, assuming that ART does not affect anatomic changes. NTCP calculations were done based on the LKB model for both planned and delivered dose, using input parameters based on work by Burman et al. and Emami et al. (1,2) OAR were contoured if deemed at risk and subsequently peer-reviewed by a team of experienced head and neck radiation oncologists. The overall NTCP per patient was calculated by multiplication of the chance of no toxicity i.e.

$$1-\prod_{n=1}^{N}(1-NTCP_n)$$

,for both the planned and delivered dose.

Results: On average, 6 OAR per patient were contoured. In 8 patients (22%), the difference in overall NTCP between planned and delivered dose was >3%. In half of them, NTCP of delivered dose was lower than planned. The largest difference in overall NTCP was 14% (Figure 1). The patients with the largest differences in overall NTCP could not be identified based on largest absolute dose differences for the OAR. Of the 8 patients that received ART clinically, 3 had an overall NTCP difference >3%.

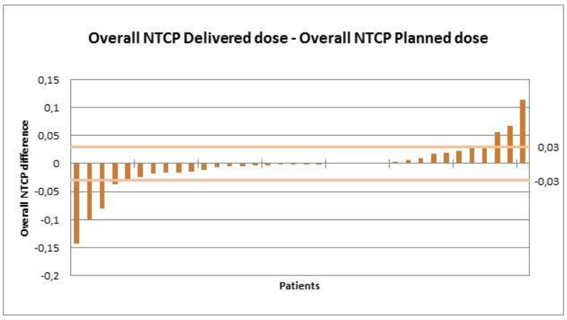

Figure 1. Difference in overall NTCP between delivered and planned dose . A value > 0 means delivered dose NTCP was higher than planned dose NTCP.

Conclusion: Differences >3% in overall NTCP between planned and delivered dose occur in about 1/4th of the head and neck cancer patients. Both increases and decreases in NTCP were observed, stressing the need for ART to either reduce NTCP or allow dose escalation. Expert opinion does not identify the same patients for ART as NTCP calculations do. A model to select patients for ART, however, should not only be based on changes in NTCP but should also include possible changes in TCP. Thus, further research is warranted to timely identify patients in which these differences occur, and on how to optimize the allocation of ART.

1 C Burman et al, *IJROBP*, 1991
2 B Emami et al, *IJROBP*, 1991

PO-0907

Effect of weight loss in head and neck patients in the presence of a magnetic field

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Purpose or Objective: Head and neck patients experience weight loss in a predictable pattern during treatment. CTV volumes typically reduce in volume by a third, as do the parotid glands. Adaptive methods for these patients focus on an offline protocol where the patient is rescanned and planned at two-to-three weeks through treatment, resulting in significant reduction in parotid doses. The MR linac (Elekta, AB, Stockholm, Sweden) will provide excellent soft tissue contrast which may be desirable for this group of patients, e.g., for tumour response monitoring. The presence of the magnetic field results in the Lorentz force causing electrons exiting the patient to spiral and be incident on the exit surface. This may potentially result in an increased dose to superficial tissues, i.e. the parotid glands. This effect can be controlled in plan optimisation. It is unknown, however, whether the presence of the magnetic field makes it necessary to adapt the plan at an earlier stage or more frequently during treatment. It is therefore the purpose of this paper to evaluate the effect of the magnetic field on need for adaptive radiotherapy in the head and neck.

Material and Methods: Five patients were selected from the clinical archive that had shown significant weight loss during treatment and required a repeat CT. Both the initial planning CT and the repeat CT were fully contoured including spinal cord, brainstem, left and right parotids. An initial plan was created for the planning CT using Monaco, Elekta AB Stockholm, Sweden, which met the departmental constraints for OAR dose. This plan was optimised with the B field set to 1.5T and then re-calculated at 0T, allowing the segmentation to remain constant. Plans were calculated with a 1% statistical uncertainty with the GPUMCD algorithm. The plans were transferred onto the re-scan CT and re-calculated. The magnitude of the change in dose to the OARs due to weight loss was compared between the 0T and 1.5T plans.

Results: Table one shows the results of the analysis for the five initial patients investigated. Spinal cord, brainstem and parotid glands are included in the table. Entries in red show that the magnitude of change in the OAR dose is greater, resulting in a larger dose to that OAR compared to the complementary plan. The spinal cord and brainstem do not show a trend, with the 0T and 1.5T plans showing increase dose in an equal number of plans. However, for the parotid glands the magnitude of the change in dose is greater with the 1.5T field present with the majority of plans showing an increase.

		Pt1		Pt2		Pt3		Pt4		Pt5	
		0T	1.5T	0T	1.5T	0T	1.5T	0T	1.5T	0T	1.5T
BS PRV	Max	-113	33	340	66	47	250	-494	-616	1126	1557
	Dose to 1cc	-233	-23	524	244	241	295	-663	-806	1039	1355
SC PRV	Max	33	140	1105	814	103	204	2084	1882	92	-374
	Dose to 1cc	-97	72	1060	742	174	141	1766	1409	-77	-498
LT PAROTID	Mean	85	309	143	301	462	564	-437	-644	-160	-184
RT PAROTID	Mean	-	-	-636	-431	67	133	2143	2255	-73	49

Table1. Increase in cGy for each OAR when the plan optimised for the original planning scan is delivered onto the scan displaying weight loss, entries in red show that the magnitude of change to dose is greater than the complementary plan.

Conclusion: The results from these patients indicate that weight loss in head and neck patients results in a greater increase in dose to the parotid glands when treated in a magnetic field. Adaptive protocols for these patients therefore require more frequent adaption than the current mid-treatment approach.

PO-0908

Inter-fraction OAR dose variation in pancreatic SBRT using contrast-enhanced in-room diagnostic CT

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Purpose or Objective: In SBRT for Locally Advanced Pancreatic Carcinoma (LAPC), the nearby organs of the GI tract are dose limiting. Given the daily positional variation of those OARs, the planning approach is conservative, often leading to concessions in the PTV coverage. The purpose of this study is to evaluate the daily variation in abdominal organ dose.

Material and Methods: For this study, 5 patients were treated for LAPC with SBRT on a Cyberknife to a prescribed dose of 40 Gy in 5 fractions. During treatment, respiratory tracking was applied using implanted fiducials for real-time alignment of the treatment beams to the target. Planning constraints for the OARs included a maximum of 5 cc to